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10/772,511

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Jia-Xing Lin

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THOMAS, KAYDEN, HORSTEMEYER & RISLEY, LLP

600 GALLERIA PARKWAY, S.E.

STE 1500

ATLANTA, GA 30339-5994

EXAMINER

PATEL, REEMA

ART UNIT

PAPER NUMBER

2812

MAIL DATE

DELIVERY MODE

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/772,511

Applicant(s)

LIN ET AL.

Examiner

Reema Patel

Art Unit

2812

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 05 February 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 13-20 is/are allowed.
- 6) ☒ Claim(s) 1-5 and 9-12 is/are rejected.
- 7) ☒ Claim(s) 6-9 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
  - 2) ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Priority*

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1, 4-5, and 12 are rejected under 35 U.S.C. 102(b) as being anticipated by Nakajima et al. (U.S. 2001/0010391 A1).
4. Regarding claim 1, Nakajima et al. discloses forming a heat sink layer on a substrate and patterning the heat sink layer to form an opening, wherein the opening exposes a portion of the substrate ([0052]); forming an amorphous silicon layer on the substrate ([0053]); dehydrogenating the amorphous silicon layer ([0053]); and laser annealing the amorphous silicon layer to form a polysilicon layer ([0054]).
5. Regarding claims 4-5, Nakajima et al. discloses the laser annealing comprises using a XeCl excimer laser light source at an energy of 100-500 mJ/cm<sup>2</sup> ([0054]).

6. Regarding claim 12, Nakajima et al. discloses that the subsequently formed polysilicon layer is used in a TFT device and discloses further processing steps ([0052]-[0074]).

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsao (U.S. 6,867,074 B2) in view of Nakajima et al. (U.S. 2001/0010391 A1).

9. Regarding claim 1, Tsao discloses forming a heat sink layer on a substrate and patterning the heat sink layer to form an opening, wherein the opening exposes a portion of the substrate (col 4, line 67 – col 5, line 2); forming an amorphous silicon layer on the substrate (col 5, lines 16-17); and laser annealing the amorphous silicon layer to form a polysilicon layer (col 5, lines 20-23).

10. Yet, Tsao does not disclose dehydrogenating the amorphous silicon layer before laser annealing. However, Nakajima et al. discloses dehydrogenating an amorphous silicon surface ([0053]) so as to prevent a hydrogen explosion during the subsequent laser annealing. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Tsao with dehydrogenating the amorphous silicon surface, as taught by Nakajima et al., so as to prevent a hydrogen explosion during the subsequent laser annealing.

11. Regarding claims 2-3, Tsao discloses the heat sink layer comprises a silicon nitride layer deposited by a PECVD process (col 4, line 67 – col 5, line 3).

12. Claims 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakajima et al. (U.S. 2001/0010391 A1) as applied to claim 1 above, and further in view of Lin (U.S. 7,071,083 B2).

13. Regarding claims 9-11, Nakajima et al. does not disclose forming a heating layer on the amorphous silicon layer. However, Lin discloses forming a semitransparent heating layer on the amorphous silicon (col 3, lines 32-53) which has the advantage of increasing the grain size of the subsequently formed polysilicon layer. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to form a heating layer on the amorphous silicon prior to annealing so as to increase the grain size of the subsequently formed polysilicon film.

***Allowable Subject Matter***

14. Claims 6-8 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claim 6 contains allowable subject matter because of the limitation of forming a heat resistant layer before forming the heat sink layer and during the step of patterning the heat sink layer, exposing the heat resistant layer. Claims 7-8 depend on claim 6.

15. Claims 13-20 are allowed. Claim 13 is allowable because of the limitation of forming a heat resistant layer before forming the heat sink layer and during the step of

patterning the heat sink layer, exposing the heat resistant layer. Claims 14-20 depend on claim 13.


**Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Reema Patel whose telephone number is 571-270-1436. The examiner can normally be reached on M-F, 8:00-4:30 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Lebentritt can be reached on 571-272-1873. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

RSP

  
MICHAEL LEBENTRITT  
SUPERVISORY PATENT EXAMINER